

ATTACHMENT 1

COMPARISON BETWEEN NRC REQUIREMENTS AND BOARDS CERTIFICATION PROGRAMS

This Attachment contains tables showing comparisons between NRC's T&E requirements, as specified in the final rule, and the boards' certification programs.

The comparisons include the following authorized individuals:

Table 1	Radiation safety officer (§ 35.50)
Table 2	Authorized medical physicist (§ 35.51)
Table 3	Authorized nuclear pharmacist (§ 35.55)
Table 4	Authorized user in uptake, dilution, and excretion studies (§ 35.190)
Table 5	Authorized user in imaging and localization (§ 35.290)
Table 6	Authorized user in unsealed byproduct material requiring written directive (§ 35.390)
Table 7	Authorized user in manual brachytherapy sources (§ 35.490)
Table 8	Authorized user in remote after loader units, teletherapy units, and gamma stereotactic radiosurgery units (§ 35.690)

**Table 1 - Certification Requirements for
Radiation Safety Officer (RSO) (35.50)**

Final rule	Certification Through T&E Process			Certification Through Board Process
	(A) Didactic training	(B) Experience	(C) Certification	
	<u>35.50(b)(1)(i)</u> 200 hours in: 1. Rad phy/instrument 2. Rad protection 3. Math for use/meas of radioactivity 4. Rad biology 5. Rad dosimetry	<u>35.50(b)(1)(ii)</u> One year supervised radiation safety experience in similar uses in: 1. Shipping/receiving & rad surveys 2. Performing checks on instruments 3. Securing/controlling byproduct material 4. Using controls to avoid mistakes in administration of byproduct material 5. Using procedures to prevent contamination & proper decontam 6. Using emergency procedures to control byproduct material 7. Disposing byproduct material	<u>35.50(b)(2)</u> Signed by a preceptor RSO that the individual satisfies (A) + (B) + can function independently	<u>35.50 (a)</u> (A) + (B) + (C) + Additional Board Requirements (e.g. examination)
Example of Boards Listed in Subpart J	Training/Education	Experience	Certification/References	Additional Board Requirements
Am B of Health Physics In Comprehensive Health Physics	BS deg in physical science, engineering, or biological science with minor in physical science or eng.	6 yrs prof exp - at least 3 yrs in applied health physics (MS, subst 1 yr exp; PhD subst 2 yrs)	Certification: Board Chairperson certifies met prof standards of the board References: The individual's supervisor; 2 other professionally qualified to evaluate candidates ability in HP (at least 1 certified)	Written Exam: Part I- fundamental HP; Part II- applied HP; covering 5 domains: measurements, regulation/standards, facilities/equipment, operation/procedure, education/training

**Table 2 - Certification Requirements for
Authorized Medical Physicist (AMP) (35.51)**

Final rule	Certification Through T&E Process		Certification Through Board Process
	(A) Training & Experience	(B) Certification	
	<u>35.51(b)(1)</u> 1. Master/doctoral deg in physics, biophysics, radiological physics, or medical physics 2. One year training in therapeutic radiological physics 3. Additional year work experience under an AMP at medical institution, including the following specific tasks, as applicable: a. 35.67 Reqs for sealed sources & brachytherapy sources b. 35.433 Decay of Sr-90 sources c. 35.632 Full calibration measurements on teletherapy units d. 35.633 Full calibration meas on remote after loader units e. 35.635 Full calibration meas on gamma radiosurgery units f. 35.642 Periodic spot-check for teletherapy units g. 35.643 Periodic spot-check for remote after loader units h. 35.645 Periodic spot-check for gamma radiosurgery units i. 35.652 Radiation surveys	<u>35.51(b)(2)</u> Signed by a preceptor AMP who meets 35.51 that the individual satisfies (A) + can function independently for each type of therapeutic medical unit	

Examples of Boards Listed in Subpart J:	Training/ Education	Experience	Certification/ References	Additional Board Requirements
A. Am B of Radiology in: 1. Therapeutic radiology physics 2. Roentgen ray and gamma ray physics 3. X-ray and Radium physics 4. Radiology physics	1. Bachelor deg in phy, eng, etc. and 2. Master/doc deg in med phy, phy, eng, etc. and 3. Formal course work in biological sciences	3 yrs exp with clinical department (MS subst 6 month, PhD subst 12 month) under supervision of cert physicist or radiologic physician	One certif physician & one certif physicist in the same specialty Physicist must directed the special training References must have personal knowledge of the applicant	1. Written exam: Part 1 includes measurements, radiation protection, clinical aspects of radiological physics Part 2 includes 3 subparts: Therapeutic phy; diagnostic phy, and medical nuclear phy (radioactive sources, calibration, rad protection). 2. Oral exam: 5 parts, including radiation safety & patient safety, patient related measurement, equipment, etc.
B. Am B of Medical Physics in radiation oncology physics	Graduate deg in physics, med phy, or other related field	1. Clinical residency training from an accredited program or 2. MS-6 yrs, MS (med phy)-4 y MS (med phy, accredited)-3 y PhD-4 y PhD (med phy)-3 y PhD (m.p. accr)-2 y	2 Ltrs of endorsement to verify work experience and professional qualifications- must be from a certified medical physicist and a certified physician who practice in the medical specialty and who has personal Knowledge	1. Written exam: Part I: Fundamental medical physics, including radiation protection, radiation measurements Part II: For specialty areas in: medical health physics, radiation oncology phy, etc. 2. Oral exam: include rad safety/hazards

**Table 3 - Certification Requirements for
Authorized Nuclear Pharmacist (ANP) (35.55)**

Final rule	Certification Through T&E Process			Certification Through Board Process
	(A) 700 hrs structured educational program		(B) Certification	
	<u>35.55(b)(1)(i)</u> Didactic training in: 1. Rad phy/instrument 2. Rad protection 3. Math for use/meas of radioactivity 4. Chemistry of byproduct material for med use 5. Rad biology	<u>35.55(b)(1)(ii)</u> Supervised practical experience in a nuclear pharmacy in: 1. Shipping/receiving & rad surveys 2. Performing checks on instruments 3. Calc, assay, & safely preparing dosages 4. Using controls to avoid mistakes in administration of byproduct material 5. Using procedures to prevent contaminata & proper decontam	<u>35.55(b)(2)</u> Signed by a preceptor ANP that the individual satisf (A) + can function independently	<u>35.55 (a)</u> (A) + (B) + Additional Board Requirements (e.g. examination)
Example of Boards Listed in Subpart J	Training/ Education	Experience	Certification/ References	Additional Board Requirements
Board of Pharmaceutical Specialties as a nuclear pharmacist	1. Graduation from a pharmacy program accredited by Am Council on pharmaceutical Education 2. Must have current license to practice pharmacy	4000 hours experience (MS or PhD in nuclear pharmacy subst 2000hrs.)	None	Written exam in 9 domains, including health and safety domain

**Table 4 - Certification Requirements for
Authorized User in Uptake, Dilution, and Excretion Studies (35.190)**

Final rule	Certification Through T&E Process			Certification Through Board Process
	(A) 60 hrs of Training and Experience		(B) Certification	
	<u>35.190(c)(1)(i)</u> Classroom and laboratory training in: 1. Radiation phy/instrument 2. Rad protection 3. Math for use/meas of radioactivity 4. Chemistry of byproduct material for med use 5. Rad biology	<u>35.190(c)(1)(ii)</u> Work experience under AU (who meets 35.190, 290, or 390) in: 1. Ordering/receiving, unpacking, rad surveys 2. Calibrate dose instrument & performing checks on survey meter 3. Calc, measuring, & safely preparing dosages 4. Using controls to prevent medical events involving unsealed byproduct material 5. Using procedures to contain spills & proper decontam 6. Administering dosages	<u>35.190(c)(2)</u> Signed by a preceptor AU (who meets 35.190, 290, or 390) that the candidate satisfies (A) + can function independently	<u>35.190(a)</u> (A) + (B) + Additional Board Requirements (e.g. examination)
Example of Boards Listed in Subpart J	Training/ Education	Experience	Certification	Additional Board Requirements
Am B of Nuclear Medicine in nuclear medicine	1. Graduation from a medical school approved by the Liaison Committee on Medical Education 2. Valid license to practice of medicine	1. One or more yrs of preparatory post-doc training and 2. Two-yr formal residency training	Requires residency program directors to certify the applicant is competent in clinical nuclear medicine.	Written exam

**Table 5 - Certification Requirements
Authorized User in Imaging and Localization Studies (35.290)**

Final rule	Certification Through T&E Process			Certification Through Board Process
	(A) 700 hrs of Training and Experience		(B) Certification	
	<u>35.290(c)(1)(i)</u> Classroom and laboratory training in: 1. Radiation phy/instrument 2. Rad protection 3. Math for use/meas of radioactivity 4. Chemistry of byproduct material for med use 5. Rad biology	<u>35.290(c)(1)(ii)</u> Supervised work under AU (who meets 35.290 or 35.390) in: 1. Ordering/receiving, unpacking, rad surveys 2. Calibrating dose instrument & performing checks on survey meter 3. Calc, measuring, & safely preparing dosages 4. Using controls to prevent medical events involving unsealed byproduct material 5. Using procedures to contain spills & proper decontam 6. Administering dosages 7. Eluting generator systems & preparing radioactive drugs	<u>35.290(c)(2)</u> Signed by a preceptor AU who meets 35.290 or 35.390 that the candidate satisfies (A) + can function independently	<u>35.290(a)</u> (A) + (B) + Additional Board Requirements (e.g. examination)
Example of Boards Listed in Subpart J	Training/ Education	Experience	Certification	Additional Board Requirements
Am B of Nuclear Medicine in nuclear medicine	1. Graduation from a medical school approved by the Liaison Committee on Medical Education 2. Valid license to practice of medicine	1. One or more yrs of preparatory post-doc training and 2. Two-yr formal residency training	Requires residency program directors to certify the applicant is competent in clinical nuclear medicine.	Written exam

Table 6 - Certification Requirements
Authorized User in Unsealed Byproduct Material Req Written Directive (35.390)

Final rule	Certification Through T&E Process			Certification Through Board Process
	(A) 700 hrs of Training and Experience		(B) Certification	
	<u>35.390(b)(1)(i)</u> Classroom and laboratory training in: 1. Radiation phy/instrument 2. Rad protection 3. Math for use/meas of radioactivity 4. Chemistry of byproduct material for med use 5. Rad biology	<u>35.390(b)(1)(ii)</u> Supervised work under AU (who meets 35.290 or 35.390) in: 1. Ordering/receiving, unpacking, rad surveys 2. Calibrating dose instrument & performing checks on survey meter 3. Calc, measuring, & safely preparing dosages 4. Using controls to prevent medical events involving unsealed byproduct material 5. Using procedures to contain spills & proper decontam 6. Eluting generator systems & preparing radioactive drugs 7. Administering dosages (at least 3 cases in each of 4 categories)	<u>35.390(b)(2)</u> Signed by a preceptor AU who meets 35.390(a) or (b) and who has experience in same dose categories that the individual satisfies (A) + can function independently	<u>35.390(a)</u> (A) + (B) + Additional Board Requirements (e.g. examination)
Example of Boards Listed in Subpart J	Training/ Education	Experience	Certification	Additional Board Requirements
Am B of Nuclear Medicine	1. Graduation from a medical school approved by the Liaison Committee on Medical Education 2. Valid license to practice of medicine	1. One or more yrs of preparatory post-doc training and 2. Two-yr formal residency training	Requires residency program directors to certify the applicant is competent in clinical nuclear medicine.	Written exam

**Table 7 - Certification Requirements for
Authorized User in Manual Brachytherapy Sources (35.490)**

Final rule	Certification Through T&E Process				Certification Through Board Process
	(A) Didactic	(B) Work Experience	(C) Clinical Experience	(D) Certification	
	<u>35.490(b)(1)(i)</u> 200 hours Classroom and laboratory training in: 1. Radiation phy/instrument 2. Rad protection 3. Math for use/meas of radioactivity 4. Rad biology	<u>35.490(b)(1)(ii)</u> 500 hours work experience under AU (who meets 35.490) in: 1. Ordering/receiving, unpacking, rad surveys 2. Checking survey meters 3. Preparing, implanting, removing sources 4. Maintaining running inventories 5. Using controls to prevent medical events involving byproduct material 6 Using emergency procedures to control byproduct material	<u>35.490(b)(2)</u> 3 years supervised clinical experience under AU (who meets 35.490)	<u>35.490(b)(3)</u> Signed by a preceptor AU (who meets 35.490) that the individual satisfies (A) + (B) + (C) + can function independently	<u>35.490(a)</u> (A) + (B) + (C)+ (D) + Additional Board Requirements (e.g. examination)
Example of Boards Listed in Subpart J	Training/ Education	Experience	Certification	Additional Board Requirements	
Am B of Radiology	1. Graduation from a medical school 2. Is a specialist in Radiation Oncology 3. Have high moral & ethical standards in his/her profession	five yrs - 4 yr must be in Radiation Oncology	A written statement from current program director of special training attesting that the applicant will have satisfactorily completed the required special training & will have achieved adequate professional qualifications for the exam in radiation oncology	1. Written exam 2. Oral exam	

**Table 8 - Certification Requirements for
Authorized User in Remote Aterloader Units, etc. (35.690)**

Final rule	Certification Through T&E Process				Certification Through Board Process
	(A) Didactic	(B) Work Experience	(C) Clinical Experience	(D) Certification	
	<u>35.690(b)(1)(i)</u> 200 hours Classroom and laboratory training in: 1. Radiation phy/instrument 2. Rad protection 3. Math for use/meas of radioactivity 4. Rad biology	<u>35.690(b)(1)(ii)</u> 500 hours work experience under AU (who meets 35.690) in: 1. Reviewing full calibration & spot check 2. Preparing treatment plans & calc treatment dose/time 3. Using adm controls to prevent med events 4. Implementing emergency procedures for abnormal operation 5. Checking/using survey instruments 6 Selecting proper dose & how it is to be administered	<u>35.690(b)(2)</u> 3 years supervised clinical experience under AU (who meets 35.690)	<u>35.690(b)(3)</u> Signed by a preceptor AU (who meets 35.690 for each type relevant therapeutic unit) that the individual satisfies (A) + (B) + (C) + can function independently	<u>35.490(a)</u> (A) + (B) + (C)+ (D) + Additional Board Requirements (e.g. examination)
Example of Boards Listed in Subpart J	Training/ Education	Experience	Certification	Additional Board Requirements	
Am B of Radiology	1. Graduation from a medical school 2. Is a specialist in Radiation Oncology 3. Have high moral & ethical standards in his/her profession	five yrs - 4 yr must be in Radiation Oncology	A written statement from current program director of special training attesting that the applicant will have satisfactorily completed the required special training & will have achieved adequate professional qualifications for the exam in radiation oncology.	1. Written exam 2. Oral exam	